DOT/FAA/AM-01/14

Office of Aerospace Medicine
Washington, DC 20591

Aviation Accidents and Incidents Associated With the Use of Ophthalmic Devices by Civilian Pilots

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July 2001

Final Report

U.S. Department of Transportation
Federal Aviation Administration

NOTICE

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/AM-01/14		

4. Title and Subtitle	5. Report Date
Aviation Accidents and Incidents Associated With the Use of Ophthalmic Devices by Civilian Pilots	July 2001
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
Nakagawara V.B., Montgomery R.W., and Wood K.J.	
9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
FAA Civil Aerospace Medical Institute P.O. Box 25082 Oklahoma City, OK 73125	11. Contract or Grant No.
12. Sponsoring Agency name and Address	13. Type of Report and Period Covered
Office of Aerospace Medicine Federal Aviation Administration 800 Independence Ave, S.W. Washington, DC 20591	14. Sponsoring Agency Code
15. Supplemental Notes	

16. Abstract

Introduction. Approximately 54% of civilian pilots rely on ophthalmic lenses to correct defective vision and maintain a valid airman medical certificate. The use of these devices can potentially create operational problems in an aviation environment. This report reviews aviation accidents and incidents in which ophthalmic lenses used by civilian pilots were contributing factors in the mishaps between 1 January 1980 and 31 December 1998. **Methods.** The National Transportation Safety Board's (NTSB's) Aviation Accident/Incident Database and the Federal Aviation Administration's (FAA's) Incident Data System were queried for terms related to ophthalmic lenses for the period1980-98. All reports annotated with ophthalmic terms were reviewed and stratified based on the type of ophthalmic correction used and if the device was determined to be a factor in the mishap. Additionally, the Aviation Safety Reporting System (ASRS), which allows aviation personnel to report actual or potential discrepancies and deficiencies involving the safety of aviation operations, was similarly queried and reviewed for the period 1988-98. **Results.** The NTSB and FAA databases included 16 mishaps in which factors, such as lost/broken eyeglasses, problems with sunglasses, incompatibility with personal protective breathing equipment, adaptation difficulties, inappropriate ophthalmic prescriptions and contact lenses, were found to be contributing factors in aviation accidents or incidents. Aviation personnel voluntarily submitted 26 ASRS reports describing operational problems involving traditional ophthalmic devices that adversely affected aviation safety. **Conclusions.** Ophthalmic devices used by pilots have contributed to aviation accidents and incidents. The review and reporting of these mishaps and self-reported operational problems provide important information that may be used to educate flight crewmembers, Aviation Medical Examiners, and eyecare practitioners about the potential hazards of using inappropriate ophthalmic devices. Recommendations that can assist pilots in avoiding similar hazardous situations and enhance aviation safety are discussed.

17. Key Words	18. Distribution Statement
Aviation, Accidents, Eyeglasses, Contact Lenses	Document is available to the public through the National Technical Information Service; Springfield, VA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	13	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

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INTRODUCTION

Civil aviation is a popular vocation and avocation. Currently, there are approximately 590,000 active civil airmen in the United States. All civilian pilots must maintain a current aeromedical certificate (first-, second-, or third-class) for the type of flying performed (air transport, commercial, or private pilot).

To qualify for an aeromedical certificate of a particular class, pilot applicants must meet the minimum vision standards for that class. Eye and vision problems are a major cause for administrative review for initial and renewal of aeromedical certification. Defective vision is the most frequent cause of medical restrictions for pilots. In 1998, approximately 54% of civilian pilots were required to use ophthalmic lenses to correct defective vision while flying (1).

Use of ophthalmic devices may cause operational problems in the aviation environment. For eyeglasses, spectacle frames can reduce the field of vision and be incompatible with headsets, other communications devices, and personal protective breathing equipment (PPBE). Improperly fitting frames can cause physical discomfort and be displaced during flight maneuvers due to centrifugal and gravitational forces. Additionally, spectacle lenses may become dislodged in-flight and fog with changes in air temperature and humidity. Furthermore, adapting to multifocal spectacle lenses may be difficult, as the older aviator often requires special prescriptions for the unique visual demands of the cockpit (2).

Operational problems may also result with the use of contact lenses, due to the low relative humidity, changes in barometric pressure and altitude hypoxia that are indigenous to the cockpit environment. The low humidity levels (10-15%) in an aircraft can dehydrate hydrophilic (soft) contact lenses and result in vision performance (low-contrast acuity) loss (3), reduced lens movement, and increased conjunctival injection (4). Nitrogen gas bubbles can form beneath a contact lens affecting vision as a result of decompression (5). Furthermore, corneal edema has been reported in well-fit contact lens wearers exposed to altitude hypoxia, which can result in reduced visual performance (6).

Aviation accidents and incidents associated with the use of traditional ophthalmic devices have not been well documented in the scientific literature. The purpose of this report is to review actual in-flight events where the use of ophthalmic correction by pilots was found to have contributed to an aviation accident or incident.

METHODS

The National Transportation Safety Board (NTSB) Aviation Accident/Incident Database and the Federal Aviation Administration (FAA) Incident Data System were queried for terms related to ophthalmic lenses for the period 1980-98. Search terms included glasses, eyeglasses, and contact lenses. Additionally, the Aviation Safety Reporting System (ASRS) was similarly queried for the period 1988-98. (Note: The ASRS was established in 1988 under a Memorandum of Agreement between the FAA and the National Aeronautics and Space Administration [NASA] to lessen the likelihood of aviation accidents. Pilots, air traffic controllers, flight attendants, mechanics, ground personnel, and others involved in aviation operations may submit reports to the ASRS when they are involved in, or observe, a situation in which aviation safety is compromised.)

The records collected from the three database searches were organized by type of ophthalmic device used. The narratives of each record were reviewed to determine whether use or misuse of an ophthalmic device was considered a contributing factor in the aviation accident or incident. In this study, events that did not involve the pilot-in-command of an air transport or general aviation aircraft were omitted.

RESULTS

For the period 1 January 1980 to 31 December 1998, there were a total of 41,963 records (40,476 accidents, 1,497 incidents) in the NTSB Aviation Accident/Incident Database. A search of ophthalmic terms and review of causal factors found a total of 15 accidents in which the ophthalmic devices (11 spectacles, four contact lenses) used by the pilots were a contributing factor in the mishap. For the same period, 61,829 incidents in the FAA Incident Data System were searched for ophthalmic terms and the results reviewed. This review found only one incident associated with the use of an ophthalmic device (contact lenses).

For the period January 1988 to December 1998, there were a total of 204,007 reports in the ASRS. A search and review of these reports identified 26 events where the use of spectacles was associated with operational problems.

Appendix A provides a complete tabulated listing of the 42 records found in the NTSB, FAA, and ASRS databases described above. This listing includes the report number, date, event type, category of operation, aircraft type, and a brief narrative of each event.

Table 1 summarizes the events in Appendix A and categorizes them by similar contributing factors. The table includes a brief description of the contributing factor as well as the number and type of event.

DISCUSSION

Air transport aviation accidents and incidents are rare events, but general aviation mishaps occur with much more frequency. Unfortunately, the available resources to investigate these events are limited. The NTSB employs some 50 investigators to study approximately 2,200 accidents and incidents each year. Due to the shortage of resources, the majority of investigations are limited in scope and much of the

Table 1: This is a summary of aviation accidents and incidents associated with ophthalmic devices by probable cause categories.

Aviation Accidents and Incidents Associated With Ophthalmic Devices by Probable Cause			
Probable Cause	**Incident**	**Accident**	**Total**
1. Eyeglasses were lost or broken during flight resulting in impaired visual performance.	5	6	**11**
2. New or inappropriate refractive correction resulting in impaired visual performance.	9	3	**12**
3. Required refractive correction was not worn.		4	**4**
4. The lack or misuse of sunglasses resulting in diminished visual performance.	6	1	**7**
5. Eyewear interfered or prevented proper use of protective breathing equipment resulting in hypoxia and/or impaired vision.	6		**6**
6. Contact lens(es) became displaced or dislodged resulting in impaired visual performance.	1	1	**2**
	27	**15**	**42**

information must be obtained through telephone and mail services (7). Many investigations are complicated by fragmented or faulty information and potential liability concerns that can further hinder the investigation process (8). Since the discovery of human error can result in legal sanctions or loss of employment, the individuals involved may choose to omit or distort the facts (8). As a result, it is possible that many human factor issues, including vision problems that could have contributed to accident causation are missed.

The NTSB and FAA databases contain official reports of events classified as either aviation accidents or incidents. As such, these reports are subject to careful scrutiny to ensure that the information they relate is as accurate as the known facts will allow. The terms, accident and incident refer to events that are defined, in part, as follows:

Accident. An occurrence associated with the operation of an aircraft, which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

a) a person is fatally or seriously injured,
b) the aircraft sustains major damage or structural failure, or,
c) the aircraft is missing or completely inaccessible (9).

Incident. An occurrence, other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operation (9).

The ASRS contains information that is voluntarily and anonymously contributed. The reports represent the perceptions of the reporter (e.g., pilots, crewmembers, and air traffic personnel); therefore, the objectivity of these accounts is not quantifiable. Due to the anonymous nature of these reports, it is unclear whether the FAA or the NTSB investigated these events. However, the ASRS accounts appear to fit the official definition of an aviation incident. Therefore, to facilitate the analysis and discussion of this data, all ASRS reports are, hereafter, referred to as aviation incidents.

The NTSB, FAA, and ASRS databases included 42 reports of accidents and incidents associated with the use of ophthalmic devices. Contributing factors to these events, such as lost or broken eyeglasses, the lack or misuse of sunglasses, incompatibility with PPBE, adaptation difficulties or inappropriate prescriptions, failure to wear required corrective devices, and the use of monovision contact lenses, have been documented. In most instances, these events would be considered minor inconveniences if they occurred anywhere other than in the aviation environment. However, what may be inconvenient to an individual on the ground can quickly become a life-threatening situation for a pilot in-flight.

In this study, almost 48% of the reported events involved either air carrier (43%) or air taxi (5%) pilots. In most cases, these individuals are responsible for transporting passengers. Fortunately, 90% of these events resulted in incidents, as opposed to accidents, and none resulted in a passenger fatality. Of the two reported aviation accidents, one involved an airline pilot who was flying with monovision contact lenses, which are prohibited by FAA regulations. The NTSB findings indicated that the use of the monovision correction, and its inherent reduction in depth perception, contributed to the pilot's execution of a "short landing." This resulted in considerable damage to the McDonnell Douglas MD-88 aircraft and led to three minor injuries of passengers during the ensuing emergency evacuation (10). The second accident involved an air taxi pilot. The pilot lost her prescription eyeglasses when they blew off her face as she looked out of the window to visually inspect the landing gear. Upon landing the Cessna CE-210-L, the main gear collapsed, resulting in substantial damage to the aircraft. Fortunately, no passengers were onboard this flight. The NTSB concluded that a contributing factor in the accident was the pilot's execution of a night landing without proper corrective lenses (11).

The study results indicate the most common contributory factor in aviation accidents (n=3) and incidents (n=9) related to ophthalmic devices was the use of new or inappropriate refractive correction. New prescriptions often require a period of adaptation. This period is particularly important for adjusting to presbyopic corrections, such as bifocal, trifocal, and progressive or "no-line" bifocal lenses. The cockpit is not the appropriate place to adapt to a new prescription or any new form of ophthalmic correcting device. It is recommended that, after a period of adjustment on the ground, a pilot enlist the assistance of a qualified aviator on his/her first few flights when using a new prescription or different corrective device. A pilot must be confident that the refractive correction employed in the cockpit is appropriate for the required visual tasks. Discovering a major

discrepancy between a visual demand in the cockpit environment and the ophthalmic device being used can seriously compromise aviation safety and should be rectified before attempting to fly solo.

The second most common factor contributing to aviation accidents (n=6) and incidents (n=5) was lost or broken spectacles. A readily available back-up pair of spectacles could have prevented most of these mishaps. In other instances, a strap that secures the glasses to the face or around the neck that kept the eyewear from being misplaced when removed or dislodged may have prevented the mishap.

Pilots often need sunglasses when flying during daylight hours. Tinted lenses can reduce glare, visual fatigue, and dark adaptation problems later in the flight. However, sunglasses can compromise the readability of aircraft instruments and other aviation materials, such as charts and maps, inside the cockpit. This study found that improper use or not using sunglasses contributed to one aviation accident and six incidents. When using sunglasses, a proper balance should be maintained between visibility of objects inside and outside the cockpit environment. Sunglasses that distort color, such as "yellow-shooters" and "blue-blockers," or those that prevent the transmission of too much light (i.e., < 15% transmission) should be avoided (2). Polaroid sunglasses are not recommended since they can reduce or effectively eliminate the visibility of instruments that incorporate anti-glare filters, or they can interfere with visibility through an aircraft windscreen due to striations in some laminated materials (12). In addition, polaroid sunglasses can mask the sparkle of light that reflects off shiny surfaces, such as another aircraft's wing or windscreen. This could drastically reduce a pilot's reaction time in a "see-and-avoid" traffic situation.

To protect against low barometric pressure and the resulting physiological effects of altitude hypoxia, the pilot may need to use PPBE. In this study, there were six reported incidents involving PPBE and the use of spectacle correction. Before an emergency situation arises, pilots should be certain that the aircraft's emergency equipment can be conveniently and effectively used with their eyewear. A pilot should consult an eyecare practitioner to help resolve any incompatibility problems.

The failure to use required refractive correction was found to have contributed to four aviation accidents. In occupational eye injuries, the affected individuals frequently do not wear their eye protection due to inaccurate refractive correction that cause clinical symptoms, such as eye fatigue, headache, eye pain, or decreased visual acuity (13). In other instances, the devices were not used because they were reportedly too uncomfortable to wear. An eye doctor should be consulted to ensure that proper refractive correction for the cockpit is prescribed, and spectacles are properly adjusted to ensure maximum comfort (2).

Contact lens use was associated with one aircraft accident and one incident. While flying, contact lenses can be dislodged, resulting in visual impairment (14), and inappropriate contact lenses can reduce visual performance (15). Improperly fitting lenses can irritate the eye leading to physical discomfort or pain. Contact lenses can also contribute to increased glare disability from the sun during the day and from runway lighting at night. This condition is particularly true for those individuals with light-colored eyes and clinical photophobia. A pilot who chooses to use contact lens correction should always carry a back-up pair of spectacles in the event that the contact lenses become dislodged, displaced, or if they must be removed during an in-flight emergency.

It is estimated that over 80% of all aviation accidents result from human error. Since vision is the most important sense a pilot possesses for maintaining control of the aircraft, it is logical to assume that many accidents are vision related. It is suspected that vision impairment, reduced visibility, and visual illusions play a greater role in aviation accidents and incidents than statistics suggest. For example, central vision can be diminished due to extraordinary physical stress from acceleration, vibrations, and the effects of high altitude (16). Additionally, visual illusions occur when the visual information becomes unrecognizable or is falsely perceived. The effect most often occurs when ambient vision, which aids spatial orientation and localization, is reduced or lost entirely due to darkness or adverse atmospheric conditions (17). Visual illusions can result in disorientation and lead to loss of control. Accidents occur more frequently at night and in poor environmental conditions, such as fog and haze, suggesting that optimal vision and good visibility are important factors in maintaining aviation safety and preventing accidents.

The combination of poor environmental conditions and diminished visual performance poses a serious threat to aviation safety. This study found that reduced visual performance from improper use

of ophthalmic devices or the use of inappropriate lenses has resulted in aviation accidents. In many cases, the investigation cannot determine an exact cause of an aviation accident. Without evidence to the contrary, the probable cause is often attributed to human error without specifying an exact physical or psychological effect as a contributing factor. Therefore, many more mishaps than are actually reported may be attributable to missed visual cues or visual illusions that resulted from ill-suited, lost, broken, or inappropriate refractive corrections.

To improve aviation safety, the following recommendations concerning the use of ophthalmic devices are offered to Aviation Medical Examiners (AMEs), pilots, and their eyecare practitioners:

- Eyeglasses should fit snugly on the head to prevent being dislodged. A spectacle strap that fits tightly around the head or a spectacle chain that allows the eyeglasses to be easily replaced if dislodged should be used while flying.
- All screws on the spectacle frame should be tight and ophthalmic lenses should fit snugly in the frame to prevent a lens from being dislodged. A back-up pair of eyeglasses should be readily available for the pilot in the event spectacles are damaged or displaced in flight.
- The refractive prescription should be optimal for all applicable distances for the current task at hand, and the ophthalmic device should be comfortably fit to ensure use by the pilot.
- Contact lenses should be properly maintained and frequently replaced to ensure optimal comfort and vision. When contact lenses are used, a back-up pair of eyeglasses should be available in the event a contact lens becomes dislodged, displaced, or requires immediate removal due to an emergency.
- An appropriate pair of sunglasses should be readily available during daylight flying to prevent glare or temporary flashblindness. Sunglasses should not be worn in low-light conditions.
- Use of new ophthalmic devices may result in adaptation problems. A pilot may want to perform several flights with another pilot or flight instructor to ensure new devices perform well in the cockpit environment.
- Ophthalmic devices should not interfere with the use of PPBE or communication headsets in the aircraft.

Accident investigations may often focus on a primary cause when, in fact, aviation accidents are the result of a series of events. The identification and study of all human factors in aviation accidents is recommended. Creation and implementation of preventative strategies designed to break the chain of events that lead to aviation accidents and incidents may be an effective method to reduce or eliminate such mishaps. A number of small improvements in day-to-day operations, including those recommended in this study, can have a cumulative effect on flight safety.

In conclusion, this study presents evidence that ophthalmic lenses used by pilots have contributed to aviation accidents and incidents. The review and reporting of these events provide important information that can be used to educate aviators, AMEs, and eyecare specialists about the potential hazards of using inappropriate ophthalmic devices. Implementation of the recommendations presented in this study can prevent operational problems associated with the use of such devices and improve aviation safety.

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APPENDIX A

Tabulated Listing of the Records Found in the NTSB, FAA, and ASRS Databases

NTSB AVIATION ACCIDENT/INCIDENT DATABASE					
REPORT NO.	**DATE**	**EVENT TYPE**	**CAT OF OPERATION**	**AIRCRAFT TYPE**	**NARRATIVE**
SEARCH WORD: EYEGLASSES					
ATL98LA130	9/25/98	Accident$_1$	Air Taxi	Cessna CE-210-L	When the pilot stuck her head out the window to visually inspect the landing gear, her eyeglasses blew off and affected her night landing.
LAX91LA298	7/08/91	Accident$_3$	General Aviation	Cessna 152	Pilot became disoriented and was unable to read the instrument panel because he could not find his eyeglasses.
LAX89DUG03	3/21/89	Accident$_1$	General Aviation	Unknown	After takeoff, the canopy departed the aircraft and the pilot's eyeglasses were lost.
BFO87LA029	4/09/87	Accident$_1$	General Aviation	Cessna CE-210-5 (205)	Just before touchdown, the pilot's eyeglasses broke and fell off. When his spare pair of eyeglasses that were on the instrument panel fell to the floor, he became distracted.
SEARCH WORD: GLASSES					
MIA94LA051	1/13/94	Accident$_1$	General Aviation	Helicopter ROBSIN R-22-22	While flying with the cabin door removed, the pilot's glasses blew off.
CHI90DER06	8/12/90	Accident$_3$	General Aviation	Mooney-20-C	Pilot was not wearing required corrective glasses while flying.
CHI85LA330	8/02/85	Accident$_1$	General Aviation	Mooney-20-J	Pilot's eye became irritated while attempting to land. He scratched his eye and became distracted, which resulted in a hard landing and loss of his glasses.
FTW84FA220	5/05/84	Accident$_3$	General Aviation	Unknown	Pilot was not wearing required corrective glasses while performing aerobatics in an air show.
ATL84LA070	12/20/83	Accident$_1$	General Aviation	Piper PA-28-181	While retrieving a flashlight from his briefcase, the pilot lost his glasses and was unable to find them.
DEN83FA156	7/2/83	Accident$_3$	General Aviation	Piper PA-18-150	Pilot was not wearing required corrective glasses during aerial application.
LAX83LA079	1/23/83	Accident$_4$	General Aviation	Cessna CE-140-140	The sun blinded the pilot and, while reaching for his sunglasses, the aircraft struck a mountain.
SEARCH WORD: CONTACT LENSES					
CHI96LA089	2/15/96	Accident$_2$	General Aviation	Cessna CE-210-B	While wearing monovision contact lenses, the pilot had a tendency to flare too late during landing
NYC97MA005	10/19/96	Accident$_2$	Air Carrier	McDonnell Douglas MD-88-88	While wearing monovision contact lenses, the pilot was unable to overcome visual illusions from an approach over water in limited visibility conditions.
SEA87LA176	8/25/87	Accident$_2$	General Aviation	Cessna CE-150-L	To alleviate stinging from uncomfortable contact lenses, the pilot closed his eyes during final approach and fell asleep.
LAX86LA015	10/13/85	Accident$_6$	General Aviation	Piper PA-28R-201-T	When approach lights were turned up to full bright, the pilot experienced excessive glare with her contact lenses, which distracted her.

FAA INCIDENT DATA SYSTEM					
REPORT NO.	**DATE**	**EVENT TYPE**	**CAT OF OPERATION**	**AIRCRAFT TYPE**	**NARRATIVE**
SEARCH WORD: CONTACT LENSES					
19830908065429G	9/08/83	Incident$_6$	General Aviation	Cessna CE-152	Pilot's contact lens became dislodged.

AVIATION SAFETY REPORTING SYSTEM					
REPORT NO.	**DATE**	**EVENT TYPE**	**CAT OF OPERATION**	**AIRCRAFT TYPE**	**NARRATIVE**
SEARCH WORD: EYE GLASSES					
420267	98/11	$Incident_2$	Air Carrier	Large Transport	Pilot experienced difficulty during landing while wearing eyeglasses with progressive lenses.
299204	95/03	$Incident_5$	Air Carrier	Commercial Fixed Wing	Pilot was unable to wear eyeglasses and oxygen mask at the same time.
299094	95/03	$Incident_1$	General Aviation	Commander 114	Minor aircraft damage occurred during landing when the pilot hit his eyeglass frame knocking out the right lens while attempting to adjust his headset.
101416	88/12	$Incident_1$	General Aviation	Unknown	Minor aircraft damage occurred during landing when the pilot lost his glasses while trying to visually ascertain if the landing gear was down.
82308	88/02	$Incident_5$	Air Carrier	Large Transport	While using an oxygen mask, the pilot found it difficult to put the mask over eyeglasses and earpiece.
SEARCH WORD: GLASSES					
420938	98/11	$Incident_1$	Air Carrier	Medium Transport	After bumping his glasses and having a lens fall out, the pilot misread the chart.
420087	98/11	$Incident_2$	Air Carrier	Medium Large Transport	Pilot, who normally wore contact lenses for flying, was wearing new bifocal glasses for a night landing, which he felt contributed to inadequate peripheral vision.
409722	98/07	$Incident_2$	Air Carrier	Large Transport	Pilot had difficulty reading manuals, due to his glasses and darkness in the cockpit.
367378	97/04	Operation Problem $(incident)_5$	Air Carrier	Large Transport	While using an oxygen mask, the pilot reported it forced his glasses away from his face so they were of no use.
355875	96/12	$Incident_4$	General Aviation	Cessna Citation	Pilot, while flying into the sun and not wearing sunglasses, was involved in a near mid-air collision.
331090	96/03	$Incident_1$	General Aviation	PA-28 Cherokee Archer	Pilot, who lost the left lens of his corrective sunglasses, became disoriented.
328100	96/02	Operation Problem $(Incident)_4$	General Aviation	DC-9	While flying into the bright sun with sunglasses, the pilot had to use flood lights and lower his head to see Very High Frequency Omnidirectional Radio Range (VOR) needles. This resulted in overshooting the assigned altitude, since he was unable to see his altimeter.
303370	95/04	$Incident_2$	Air Carrier	DC-9	Slightly presbyopic pilot, who had no restriction for glasses, misread the instruments.
301558	95/04	$Incident_2$	Air Carrier	B767-300	Pilot, flying with new trifocal glasses, had difficulty during landing.
265458	94/03	$Incident_1$	General Aviation	Unknown	Pilot became sick during flight. When he leaned out of window to vomit, he lost his glasses.
258014	93/11	$Incident_5$	Air Carrier	Widebody Transport	During an emergency landing, the pilot, who needed bifocals to see instruments, was unable to wear his glasses while wearing an oxygen mask.
233187	93/02	$Incident_4$	Air Carrier	Medium Transport	Pilot did not have prescription sunglasses. While looking for something to block the sun, he overshot the assigned altitude.

AVIATION SAFETY REPORTING SYSTEM					
REPORT NO.	**DATE**	**EVENT TYPE**	**CAT OF OPERATION**	**AIRCRAFT TYPE**	**NARRATIVE**
SEARCH WORD: GLASSES (continued)					
218514	92/07	$Incident_4$	Air Carrier	Light Transport	Pilot reported that, while wearing blue blocking sunglasses, he was unable to see the blue light from the engine anti-ice light system.
216039	92/07	$Incident_5$ Emg	Personal Business	Light Transport	During an in-flight emergency, the pilot was unable to read his instruments correctly. He had put on his oxygen mask and it had pushed his glasses off his face.
213213	92/06	$Incident_4$	Air Taxi	Small Transport	Pilot was reaching for his sunglasses and overshot the altitude.
208639	92/04	$Incident_5$	Air Carrier	Widebody Transport	Pilot's trifocal glasses did not fit properly while wearing an oxygen mask.
198701	92/01	$Incident_2$	General Aviation	Unknown	Pilot misread final approach charts due to poor lighting, aging eyes and glasses.
194848	91/11	$Incident_2$	General Aviation	Unknown	Pilot had difficulty reading charts with new glasses when instrument panel lights went out.
182436	91/06	$Incident_4$	Air Carrier	Medium Large Transport	While changing from his sunglasses to clear lenses, pilot overshot his altitude.
153558	90/08	$Incident_2$	Air Carrier	Large Transport	Pilot could not see charts very well, and a subsequent eye exam revealed the need for reading glasses.
151596	90/07	$Incident_2$	Air Carrier	Medium Large Transport	Pilot, who was adjusting to a new glass prescription, developed a headache, which distracted him while flying.

NTSB, FAA, and ASRS reports of ophthalmic devices associated with aviation accidents, incidents, and operational problems. This table includes the report number, date of occurrence, event type, category of flight operation, aircraft type and narrative of probable cause. (Note: Subscript in the Event Type column indicates the Probable Cause category found in Table 1.)